STATE OF SOUTH CAROLINA)

BEFORE THE
PUBLIC SERVICE COMMISSION
OF SOUTH CAROLINA

In the Matter of

Application of Duke Energy Carolinas, LLC for Approval of Decision to Incur Nuclear Generation Pre-Construction Costs

COVER SHEET

DOCKET NUMBER: 2007-440-E

(Please type or print)

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DOCKETING INFORMATION (Check all that apply)

☐ Emergency Relief demanded in petition ☐ Request for item to be placed on Commission's Agenda expeditiously

☒ Other: Direct Testimony of Dhiaa Jamil

INDUSTRY (Check one)

- ☒ Electric
- ☐ Electric/Gas
- ☐ Electric/Telecommunications
- ☐ Electric/Water
- ☐ Electric/Water/Telecom.
- ☐ Electric/Water/Sewer
- ☐ Gas
- ☐ Railroad
- ☐ Sewer
- ☐ Telecommunications
- ☐ Transportation
- ☐ Water
- ☐ Water/Sewer
- ☐ Administrative Matter
- ☐ Other:

NATURE OF ACTION (Check all that apply)

- ☐ Affidavit
- ☐ Agreement
- ☐ Answer
- ☐ Appellate Review
- ☐ Application
- ☐ Brief
- ☐ Certificate
- ☐ Comments
- ☐ Complaint
- ☐ Consent Order
- ☐ Discovery
- ☐ Exhibit
- ☐ Expedited Consideration
- ☐ Interconnection Agreement
- ☐ Interconnection Amendment
- ☐ Late-Filed Exhibit
- ☐ Letter
- ☐ Memorandum
- ☐ Motion
- ☐ Objection
- ☐ Petition
- ☐ Petition for Reconsideration
- ☐ Petition for Rulemaking
- ☐ Petition for Rule to Show Cause
- ☐ Petition to Intervene
- ☐ Petition to Intervene Out of Time
- ☐ Prefiled Testimony
- ☐ Promotion
- ☐ Proposed Order
- ☐ Protest
- ☐ Publisher's Affidavit
- ☐ Report
- ☐ Request
- ☐ Request for Certificatio
- ☐ Request for Investigatior
- ☐ Resale Agreement
- ☐ Resale Amendment
- ☐ Reservation Letter
- ☐ Response
- ☐ Response to Discovery
- ☐ Return to Petition
- ☐ Stipulation
- ☐ Subpoena
- ☐ Tariff
- ☒ Other:

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Nuclear Generation Pre-Construction Costs	)

DIRECT TESTIMONY OF DHIAA M. JAMIL FOR DUKE ENERGY CAROLINAS

Q. PLEASE STATE YOUR NAME, ADDRESS, AND POSITION.

A. My name is Dhiaa M. Jamil. My business address is 526 South Church Street, Charlotte, North Carolina. I am Group Executive and Chief Nuclear Officer for Duke Energy Carolinas, LLC ("Duke Energy Carolinas" or the "Company").

Q. WHAT ARE YOUR PRESENT RESPONSIBILITIES AT DUKE ENERGY CAROLINAS?

A. As Group Executive and Chief Nuclear Officer, I am responsible for the safe and efficient operation of the Company's three nuclear generating stations, McGuire, Oconee, and Catawba nuclear stations.

Q. PLEASE SUMMARIZE YOUR EDUCATIONAL BACKGROUND AND PROFESSIONAL EXPERIENCE.

A. I graduated from the University of North Carolina at Charlotte with a Bachelor of Science degree in electrical engineering. I am a professional engineer in South Carolina and North Carolina, and have completed the Institute of Nuclear Power Operations' ("INPO") senior nuclear plant management course and received my Duke Energy technical nuclear certification. I served as a senior member of the Institute of Electrical & Electronics Engineers ("IEEE") and recently completed a three-year assignment as a member of the Council of the National Academy for Nuclear Training. I was also a member of the Dominion Energy Management Safety Review Advisory Committee, the TVA Nuclear Safety Review Board, the PGE Nuclear Safety Review Board, and served on the York County Chamber of Commerce board of directors. I am currently a member of the Charlotte Research Institute Board of Directors, Electric Power Research Institute, Executive Council

Nuclear Power, the INPO Executive Advisory Group, and the Nuclear Energy Institute Nuclear Strategic Issues Advisory Committee.

I began my career at Duke Energy Carolinas in 1981 as a design engineer in the design engineering department. After a series of promotions, I was named Oconee Nuclear Station electrical systems engineering supervisor in 1989; electrical engineering manager in 1994; maintenance superintendent, McGuire Nuclear Station in 1997; station manager of McGuire in September 1999; and vice president of McGuire Nuclear Site in September 2002. I was named vice president of Catawba Nuclear Station in July 2003 with responsibility for all aspects of the safe and efficient operation of the nuclear site. In December 2006 I was named senior vice president of nuclear support, and I was named to my current role in February 2008.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS PROCEEDING?

A. The purpose of my testimony is to discuss the development work performed and costs incurred to date by Duke Energy Carolinas for the William States Lee, III Nuclear Station ("Lee Nuclear Station"), as well as to describe the anticipated development work and costs to be incurred during the period January 1, 2008 through December 31, 2009. I also provide background regarding Duke Energy Carolinas' current nuclear fleet and operations and discuss the general status of the development of new nuclear generation in the United States.

Q. PLEASE DESCRIBE DUKE ENERGY CAROLINAS' EXISTING NUCLEAR GENERATION PORTFOLIO.

A. Duke Energy Carolinas' nuclear generation portfolio consists of approximately 7,000 MWs of generating capacity (6,996 MWs operated; 5,020 MWs owned) from three generating stations with seven generation units. Oconee Nuclear Station, located in Oconee County, South Carolina, began commercial operation in 1973 and was the first nuclear station designed, built and operated by Duke Energy Carolinas. McGuire Nuclear Station, located in Mecklenburg County, North Carolina began commercial operation in 1981. Duke Energy Carolinas jointly owns the Catawba Nuclear Station, located on Lake Wylie in York County, South Carolina, with North Carolina Municipal Power Agency Number One ("NCMPA"), North Carolina Electric Membership Corporation ("NCEMC"), Piedmont Municipal Power Agency ("PMPA") and Saluda River Electric Cooperative, Inc. ("Saluda River").

Q. PLEASE DISCUSS DUKE ENERGY CAROLINAS' NUCLEAR OPERATIONAL PERFORMANCE.

A. The Company has been a leader in nuclear performance. Duke Energy Carolinas is not alone in its excellence, as all U.S. nuclear operations have continued on a steady pace of improvements. Operating costs for the Company's nuclear fleet are among the lowest in the nation. Over the course of the nuclear fleet's operation, the Company's nuclear performance has improved dramatically. In particular, shorter refueling outages and improved forced outage rates have contributed to increasing the capacity factors achieved by the Company's nuclear fleet.

For example, 2007 was an exemplary year for the performance of Duke Energy Carolinas' nuclear units. The nuclear system capacity factor for 2007 was 92.36%, the third highest in history of the fleet, and three of the seven units set

individual capacity factor records. During the summer of 2007, our nuclear fleet set a system record of 107 continuous days on line. Individual units also recorded significant continuous run milestones in 2007, with Oconee 3 completing a record continuous run of 432 days, McGuire 1 completing its second-longest continuous run of 446 days, and Catawba 2 also completing its second-longest continuous run of 475 days. This operational experience will serve us well during the development and operation of the Lee Nuclear Station.

Q. IN GENERAL, WHAT IS THE CURRENT STATUS OF NEW NUCLEAR GENERATION IN THE UNITED STATES?

A. Nuclear generation is undergoing a revival; according to NEI data, between 15 and 20 new nuclear projects are planned across the United States by 2020. This renewed interest is attributable to several factors, including (a) a need for new base load generation capacity over the next decade in many areas of the country, most notably in the Southeast; (b) recognition, both internationally and domestically, in the environmental benefits of nuclear generation as the focus on air emissions heightens, particularly as climate change regulation receives greater consideration; (c) the need for American business and industry, for whom the price of electricity can be a significant component of overall operating costs, to remain competitive in global markets as other countries maintain or even increase their reliance on nuclear generation; (d) rising and often volatile prices associated with the fuels used in fossil generation assets, particularly natural gas but also coal; and (e) increasing concerns about our nation's energy security and energy independence. This interest has evolved into planned projects as the result of the demonstrated safe, reliable, and

economical operation of the current fleet of nuclear power plants over the past two decades, both in the U.S. and world wide.

While all of these factors have led many utilities to announce new nuclear projects over the past couple of years, significant financial, regulatory, and technical challenges remain to be resolved. As a result, we have seen new federal and state legislation, including new laws in South Carolina and North Carolina that encourage the development of new nuclear generation. The prior nuclear construction period existed under a regulatory process where safety reviews were performed by the Nuclear Regulatory Commission ("NRC") while the facility was under construction. Additionally, each power station was designed individually, with only limited standardization employed, and operating experience from deployment of this new technology was factored continually into the review process. These factors all contributed to project cost and schedule uncertainty.

Today, standardized designs are being proposed for deployment and the nuclear regulatory review and approval process has been changed to provide for completion of the safety reviews before substantial construction is authorized. Both the standard designs and the review standards have incorporated the lessons learned from operation of the current fleet of over one hundred nuclear power units in this country. The combination of these changes should logically lead to a much higher level of predictability of project cost and schedule; however, this assumption has not yet been demonstrated.

The key to making this new approach successful will be the quality planning and preparation that is performed in advance of beginning substantial construction,

thus necessitating the need to incur significant development costs to assure project success.

Q. PLEASE DESCRIBE THE PROPOSED LEE NUCLEAR STATION.

A. The Lee Nuclear Station would be constructed in Cherokee County, South Carolina, at the Company's former Cherokee Nuclear Station site. Duke Energy Carolinas has selected the Westinghouse AP1000 reactor technology, which is an advanced nuclear power generation technology that uses the forces of nature and simplicity of design to enhance plant safety and operations, and reduce construction costs. The plant utilizes the best components of currently deployed technologies, providing a high confidence that the facility will operate at high levels of safety and reliability. Each unit has a generation capacity of 1,117 MW, and the projected annual capacity factor of the Lee Nuclear Station is expected to exceed 90% based upon current Duke Energy Carolinas nuclear fleet performance.

Q. PLEASE DESCRIBE THE DEVELOPMENT ACTIVITIES AND ASSOCIATED COSTS INCURRED BY DUKE ENERGY CAROLINAS THROUGH DECEMBER 31, 2007.

A. Duke Energy Carolinas incurred pre-construction costs of $69.6 million, including $8.3 million in accruals, through December 31, 2007. This development work consists of the following:

COLA Preparation – includes Duke Energy Carolinas' labor, expenses, and contract support for preparation of the Combined Construction and Operating License (COL) Application submitted to the Nuclear Regulatory Commission on

December 13, 2007. It also includes the activity of selecting the plant technology and the cost of community involvement activities.

Land and Right-of-Way Purchases – includes the purchase of land associated with the Cherokee site and the initial purchase of rail right-of-way.

Site Restoration and Development – includes site remediation, ongoing demolition of existing site structures, planning for site infrastructure, e.g. rail, water, and sewer services, and general site maintenance.

Engineering and Construction Planning – includes costs associated with the preliminary engineering and construction planning required to establish a firm cost and schedule as necessary before entering into an engineering, procurement, and construction agreement; plus additional engineering and planning necessary to support overall project schedule.

Q. **PLEASE DESCRIBE THE ANTICIPATED DEVELOPMENT ACTIVITIES AND ASSOCIATED COSTS FOR THE PERIOD JANUARY 1, 2008 THROUGH DECEMBER 31, 2009.**

A. The following general categories of pre-construction work are anticipated during calendar years 2008 and 2009 to continue the development of the Lee Nuclear Station:

NRC Review and hearings, which include all estimated costs associated with NRC Review Fees; costs required to answer NRC data requests regarding the COLA, and associated legal fees.

Land and Right of Way Purchases, which include the cost of acquiring land for the site as well as land for transmission and railroad right of ways.

Site Preparation, which includes costs associated with completing remaining demolition of structures previously constructed as part of the prior Cherokee Nuclear Facility. This category also includes costs associated with ongoing industrial security; utilities; miscellaneous minor site maintenance; and funds required by the Department of Homeland Security for nuclear power plant licensees and applicants. Also included are costs associated with designing rail, water, and sewer upgrades for the facility prior to the point of awarding bids to contractors.

Project Planning and Engineering, which includes costs associated with developing an engineering, procurement, and construction contract with Westinghouse Electric Corporation - Shaw Stone and Webster ("Westinghouse/ Shaw"), the consortium delivering the AP 1000 nuclear units. This category of costs also covers site-specific engineering; construction planning; and some limited initial payments on long-lead material and equipment items such as: Reactor Coolant Pumps, Containment Vessel, Reactor Pressure Vessel, Steam Generators, Control Rod Drive Mechanisms, and Condenser Circulating Water Piping.

Duke Energy Carolinas anticipates spending up to $160 million for this necessary pre-construction work for the period January 1, 2008 through December 31, 2009. This estimate is based upon the best information available to Duke Energy Carolinas at this time. Westinghouse/Shaw provided updated, detailed cost information in mid-December 2007 for the design and construction portion of the project. Duke Energy Carolinas is currently evaluating the revised Westinghouse/Shaw information, as well as the design, engineering and construction costs of the project which will be borne directly by the Company

(*e.g.*, transmission line upgrades, railroad right-of-way), rather than through the EPC contract with Westinghouse/Shaw. In addition to the Company's internal evaluation, an independent assessment of the cost information is planned. Duke Energy Carolinas anticipates that this work to review the cost information will take several months. As the information is refined during the development process, we expect the overall cost estimate to increase. The timing of receipt of a Certificate of Environmental Compatibility and Public Convenience and Necessity ("CPCN") from the Commission for the Lee Nuclear Station would also affect whether certain costs are considered to be pre-construction or construction-related from a regulatory perspective. As with any major project, Duke Energy Carolinas anticipates updating its estimate and schedule periodically, and will update the Commission accordingly.

Q. WHY DOES DUKE ENERGY CAROLINAS SEEKING APPROVAL OF THE PRUDENCE OF THE DECISION TO INCUR OBLIGATIONS RELATED TO LONG LEAD PROCUREMENT ITEMS?

A. Duke Energy Carolinas believes that payments required to ensure the timely fabrication and delivery of long-lead procurement items such as Reactor Coolant Pumps, Containment Vessel, Reactor Pressure Vessel, Steam Generators, Control Rod Drive Mechanisms, and Condenser Circulating Water Piping are prudent and constitute "pre-construction costs" because such payments are required "pre-construction" obligations to ensure that the Lee Nuclear Station can remain an option for commercial operation in the 2018 timeframe. The Company does not currently know with precision which items would require long-lead procurement

decisions, how far in advance those decisions would have to be made, or the amount or timing of advance obligations that would be required to secure and maintain a place in the fabrication queue for those items. However, our cost estimate and development schedule anticipates the Reactor Coolant Pumps, Containment Vessel, Reactor Pressure Vessel, Steam Generators, Control Rod Drive Mechanisms Condenser Circulating Water Piping, plus numerous other power plant components will need to be ordered and certain advance payments made well before on-site construction activity actually commences on the project.

Q. WHY DOES THE COMPANY'S APPLICATION SEEK APPROVAL FOR DEVELOPMENT COSTS TO BE INCURRED THROUGH 2009?

A. In order to continue to preserve the option to have the Lee Nuclear Station available to serve customers in the 2018 timeframe, the Company must continue its development efforts without interruption or delay. As I have already discussed, Duke Energy Carolinas has significant development work planned over the next two years. A great deal of the development work planned for 2009 is an extension of the work commenced in 2008. Because the Company is uncertain as to what point the activities will transition from "development" to "construction" (following receipt of the CPCN from the Commission), Commission approval now to incur development costs through 2009 will be more efficient and reduce the likelihood of possible delay or interruption.

Q. WHY DO THE DEVELOPMENT PLANS INCLUDE TWO UNITS AT THE LEE NUCLEAR STATION?

A. As Company witness Janice Hager discusses in her testimony, the 2007 Annual Plan includes one new nuclear unit in 2018 in the selected resource plan for the Base Reference Case and Carbon Reference Case, but the action plan calls for pursuing licensing of two new units over the planning horizon because of uncertainty associated with future carbon regulation. There is no material increase in costs for obtaining a Combined Construction and Operating License for two units rather than a single unit; seeking a license for a single unit, then separately pursuing a license for a second unit would result in incurring unnecessary costs. There are two aspects to the license application review process: a safety review and an environmental impact review. Since the two proposed units are identical, the safety review for both units simultaneously is not materially more complex than the review for a single unit. The environmental impact review is more comprehensive when it is performed for all potential units at the site rather than assessing the impact of each unit separately and independently. The pre-construction costs are largely independent of whether one or two units ultimately are constructed. The referenced $230 million in development costs through 2009 does not include any Unit 2-specific costs. Planning for two units at this stage preserves the option should carbon regulation or other changes develop in the next few years, and accordingly, Duke Energy Carolinas is seeking approval of its decision to continue the development for both units of the Lee Nuclear Station.

Q. DOES THE COMPANY RETAIN FLEXIBILITY TO ADJUST THE DEVELOPMENT PLANS FOR THE LEE NUCLEAR STATION?

A. Yes. As we continue the development process and gain additional information from the Westinghouse/Shaw consortium as to cost and delivery estimates, as well as update the annual integrated resource planning analysis, Duke Energy Carolinas can modify the development plans accordingly. However, at this time, we believe it is prudent to incur the development costs set forth in the Company's application to continue to preserve the Lee Nuclear Station as an option to serve our customers' needs in the 2018 timeframe.

Q. DOES THIS CONCLUDE YOUR PRE-FILED DIRECT TESTIMONY?

A. Yes, it does.